

Development Process, Typology and Analysis of the Functioning of Family Farms Case of Bir Mcherga Region of Zaghouan Governorate, Tunisia

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Abstract— In Tunisia, agriculture is important in economic growth. It is a key sector in economic, social and territorial planning. Family farms are the most common form of agriculture in the world, in both developed and developing countries. From Zaghouan Governorate, Bir Mcherga region is marked by the dominance of family farming. It is a mainly rural area where agriculture remains a key sector. Family farms play a central role in maintaining and creating jobs, and limits rural depopulation (Ounalli N and al, 2020). In fact, small family farms represent 65% of all farms in Bir Mcherga region (CRDA Zaghouan, 2018). This paper aims to analyze the functioning of the different types of family farms in Bir Mcherga delegation.

Keywords: Family Farms, Tunisia

I. INTRODUCTION

Family farms are the most common form of agriculture in the world, in both developed and developing countries (CIRAD, 2013). They have ensured the prosperity of the sector for centuries and have enabled the enormous increase in agricultural productivity over the past sixty years. All over the world, family farms play an essential role on various levels: socio-economic, environmental and cultural. Family farming accounts for almost 80% of global agricultural food production (FAO, 2014).

Reboul defined in 1976 the agricultural production system as a mode of combination between land, strengths and work means for the purposes of plant and / or animal production, common to a set of farms.

Most of the production comes from small farmers, among whom women play a very important role, who produce more than 70% of the national food, employ a significant workforce and also constitute one of workforces of rural development (Estrella P, 2014).

These family farms, often small, help create wealth, jobs and fulfill many functions: food production and territorial planning.

At the microeconomic level, this activity is characterized as occupying the family workforce, rapidly productive and allowing a better distribution of the farmer's income over time. It provides him with rapid mobilization of monetary funds and allows him to develop crop residues as fodder reserves (Zaibet and al, 2008).

With the aim of a typology, a technical and socio-economic study of the functioning and dynamics of family farms, field surveys were carried out in Bir Mcherga area with 50 farmers. These investigations dealt with the elements linked to the identification of the operator, his exploitation and the institutional environment.

The typology of family farms is based on the main correspondence analysis and the comparison tests of means (ANOVA), which has identified two types of groups which

differ from each other by a multitude of variables. The farmers in the first group include farmers settled on farms (63% of farmers) and whose main activity is agriculture, and others who live elsewhere at the rate of 37% who are active mainly in non-agricultural activities. The second group is that of pastoral farmers. Among this group, agriculture represents the main activity of the farmers surveyed. This agriculture is mainly based on sheep and cattle farming.

II. METHODOLOGY

A. Study Zone

The delegation of Bir Mcherga is located in the center of Zaghouan governorate, it is limited in the north by the region of Mhemdiya (Ben Arous), in the south by the region of El Fahs (Zaghouan), in the west by the Mjez Elbeb region (Béja) and to the east by the Zaghouan region. It has 25,413 inhabitants (MDICI, 2016).

The total agricultural area occupies 15,300 ha (CTV Bir Mcherga, 2016). It is marked by a large tree area estimated at 7,180 ha; a cereal area of 17,618 ha; and a forage area of 8000 ha. It has a livestock of 3300 cattle, 26 650 heads of sheep and 3500 heads of goats, as well as 725 beehives (MDICI, 2016).

This area became a major agricultural center in Zaghouan governorate, and provides annual average production of 1950 tonnes of vegetables; 4.910 tonnes of fruit and 8.400 tonnes of fodder, 5.755 tonnes of cereals, as well as 1.126 tonnes of red meat, 8.550 tonnes of milk and 16000 eggs (MDICI, 2016).



Fig. 1: Location of Bir Mcherga area of Zaghouan Governorate

B. Methods and Tools

The methodological approach reflects a desire to study in depth the practices and characteristics of existing family farming systems. It is a question of defining a set of indicators making it possible to identify the various types of systems and to characterize them. The second choice is that of favoring a systemic and modeling approach, resulting from theoretical and bibliographical research, as well as field surveys to lead well to this study.

Field trips were made to better orient and refine the sampling. They allow contact with farmers to facilitate the investigation. The sampling affected the various existing agricultural sectors. The list of individuals to be surveyed is extracted from the mother population with representation percentages determined with the participation of technical services and resource people in each area. Our sample affected 50 farmers with less than 10 hectares of agricultural land in this same area.

III. RESULTS

A. Typology of Agricultural Exploitation

The method used to analyze the data collected by survey questionnaire made it possible to conduct a typology of the farms concerned. The socio-economic analyzes of the survey results are based on SPSS statistical analysis software. The main ACP component analysis method has made it possible to identify a typology of these same farms. This exercise made it possible to characterize the different groups of operators with homogeneous specificities and common behavior. This method is based on 13 variables.

B. Main Component Factor Analysis (PCA)

The Kaiser-Meyer-Olkin test is around 0.589, this is an acceptable value to indicate that there is a statistical factor solution which represents the relationships between the

variables. Bartlett's Sphercite test, around 53 dll with significance, we can conclude that there is a correlation between the chosen variables (Philippeau G, 1992).

For the quality of representation, we note that all the extractions are greater than 0.5 which consequently favors the retention of these variables (Table 1).

	Initial	Extraction
Place of residence	1.000	0.456
Sheep population	1.000	0.831
Cattle workforce	1.000	0.506
trees area	1.000	0.642
course	1.000	0.705
Family labor	1.000	0.589
Percentage Family labor	1.000	0.782
Agricultural area (ha)	1.000	0.724
Selling location	1.000	0.741
Cereal area	1.000	0.712
Access to potable water	1.000	0.210
Grant	1.000	0.525
Percentage animal income	1.000	0.834

Table 1: Quality of representation (Extraction method: Analysis by Main Component)

The results of the calculation of the Total Variance explained result in three factors to be retained with cumulative extraction sums of order 33.306; 21.049 and 9.159% of the total variance in the initial solution. Regarding the Component Matrix after rotation. The other components simply weren't because their own values are less than unity. Thus the three components explain 63.513% of the total variance. The variables to be used for each component have been identified and see if there is a well-defined correlation to orient our typology according to the share of each variable on each component (Table 2). These results led to the identification of two groups of farmers.

Component	Initial own values			Extraction Sum of squares of the factors selecte			Sum of squares of the factors retained for the rotation		
	Total	% of variance	% cumulative	Total	% of variance	% cumulative	Total	% of variance	% cumulative
1	4.330	33.306	33.306	4.330	33.306	33.306	2.806	21.583	21.583
2	2.736	21.049	54.354	2.736	21.049	54.354	2.748	21.138	42.721
3	1.191	9.159	63.513	1.191	9.159	63.513	2.703	20.793	63.513
4	0.967	7.436	70.949						
5	0.807	6.211	77.160						
6	0.727	5.589	82.750						
7	0.668	5.137	87.886						
8	0.397	3.057	90.943						
9	0.363	2.791	93.734						
10	0.309	2.375	96.109						
11	0.289	2.223	98.332						
12	0.132	1.016	99.348						
13	0.085	0.652	100.000						

Table 2: Total variance explained

Examination of the matrix of factor weights after rotation shows that the first component is defined by the sheep population (0.886) and the area of the rangelands (0.837) in conflict with the subsidy (-0.720).

The second component, on the other hand, is defined by the place of sale (0.815) and the percentage of income

from livestock farming compared to total income (0.808) female family labor (0.734), cattle numbers (0.557) and the percentage of family labor. The third component is defined by the cereal area (0.801), the agricultural area (0.766), the place of residence (0.666) and the area of arboricultural crops

in conflict with the percentage of family labor relative to the total labor force (-0.562).

The factor analysis allowed us to reduce the number of variables from thirteen to three main components which will be used to group farmers with similar characteristics and behaviors.

Once the axes are defined, the projection of the scores of the individuals on the factorial plane formed by axes number 2 and number 3 made it possible to visualize the two groups presented in figure 2.

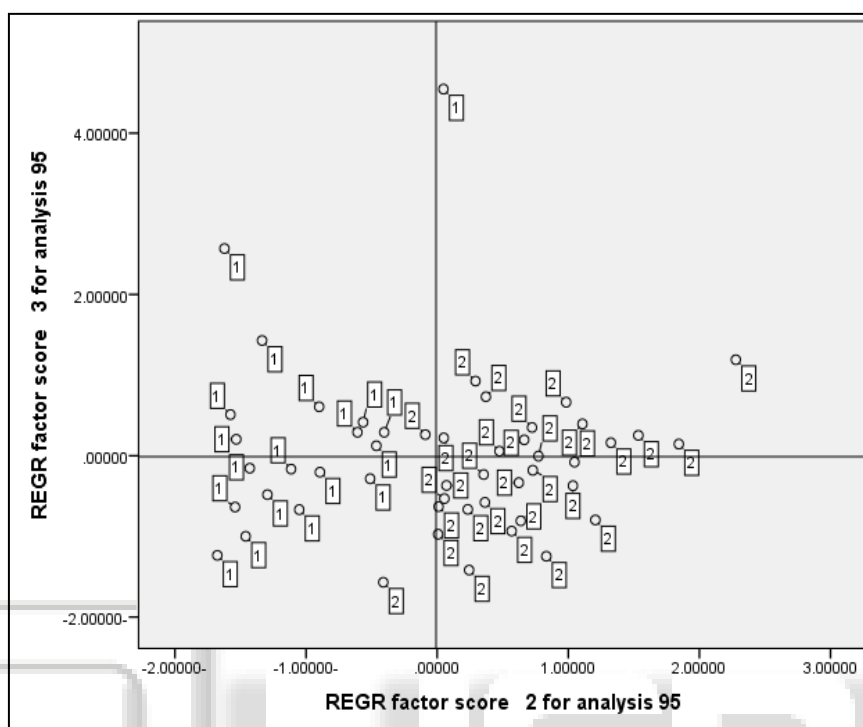


Fig. 2: projections of individuals' contributions on the plane (2,3)

Source: Our calculations by SPSS

C. Farmer Groups: Characteristics and Functioning

1) Group 1: Cereal-Arboriculturalists

This type includes 19 farmers. The heads of farms in this group stand out in terms of socioeconomic characteristics by an average age of 52 years with a minimum of 27 years and a maximum of 72 years. The average number of dependents of the head of household is 4. The use of hired labor is the only solution to ensure the various agricultural activities. The salaried workforce represents 63% of the total labor capital. It represents a significant burden for the various agricultural holdings.

Agriculture represents the main activity for 57.9% of the farmers surveyed in group 1. It is practiced as the main activity among farmers resident on their farms. While, agriculture is considered a secondary activity among non-residents of Bir Mcherga area. This type includes farmers installed on farms (63% of farmers) and others who live elsewhere at 37%.

Regarding the education level of farmers, it should be noted that 15.8% have a primary level, 26.3% have a secondary level, while only 15.8% have followed their higher education. For the type 1 population, the literacy rate is around 37%.

The way of promoting is dominated by the acquisition of land by inheritance at the rate of 79% of the farmers surveyed.

With regard to the production device, this group has an average total agricultural area of 7.55 ha. This agricultural

area is divided into rangeland with an average area of 1.13 ha and in useful area with 6.42 ha.

The cereal crops for self-consumption are dominated by the cultivation of barley because of its high resistance to drought and disease. The average areas of fodder and arboriculture remain smaller than that of cereals, they are equal to 1.78 ha and 1.26 ha respectively.

Livestock farming is a specific activity for farmers resident in Bir Mcherga area. These farmers have an average of 19 heads of sheep and an average number of less than one for cattle.

2) Group 2: Livestock Farmers

This type includes 31 farmers. The heads of farms in this group stand out in terms of socioeconomic characteristics by an average age of 53 years with a minimum of 30 years and a maximum of 75 years. The average number of dependents of the head of household is 4. The use of hired labor is the only solution to ensure the various agricultural activities. The salaried workforce represents 67% of the total labor capital. It represents a significant burden for the various agricultural farmers.

Agriculture represents the main activity for 68% of the farmers surveyed in group 1. It is practiced as the main activity for farmers who are also breeders.

Regarding the level of education of farmers, it should be noted that 51% have a primary level, 19.4% have a secondary level. For the group 2, the literacy rate is around 29%.

The way of promoting is dominated by the acquisition of land by inheritance at the rate of 71% of the farmers surveyed. The acquisition of land by inheritance has exacerbated the problem of fragmentation.

According to the production device, this group has an average total agricultural area of 6.05 ha. This agricultural area is devised in rangeland with an average area of 1.80 ha and in useful area with 4.25 ha.

The cereal crops for self-consumption are dominated by the cultivation of barley because of its high resistance to drought and disease. The average areas of fodder and arboriculture remain smaller.

Livestock farming is a specific activity for farmers resident in Bir Mcherga area. These operators have an average of 41 heads of sheep and can reach a maximum of 250 heads. The cattle population can be considered large with an average headcount of 3 heads and a maximum of 14 heads. This system is characterized by the provision of a food supplement consisting of concentrates, fodder with high nutritional value, barley and by rigorous health monitoring.

IV. CONCLUSION

Family farming is the largest employer on the planet. It provides more than 80% of the world's food by value, and in most cases it is the main producer of fresh food and earns more in the production of dairy products, and poultry.

In Tunisia, this agriculture produces more than 70% of the national food, employs a significant workforce and is also one of the main strength of rural development (Ben Salem, 1994).

The experience of Zaghuan governorate is part of this concern. Indeed this governorate, and in particular the delegation of Bir Mcherga is a mainly rural area where agriculture remains a crucial sector. In addition, family farms play a central role in maintaining and creating jobs, and limits the rural exodus.

Family farming is the most widespread form of agriculture in the world as well as in Tunisia thanks to their importance. In this context, our work consists in the study of technical and socioeconomic functioning and the dynamics of family farming in the delegation of Bir Mcherga. This study is based on a field survey of 50 farmers. Using a typological analysis using the SPSS software using the ACP method, two types of farmers were identified:

In the first type, farmers adopt a production system based mainly on cereal and arboriculture with little or no animal production which is linked to the place of residence of the farmers. These farmers are called "the cereal-arboriculturalists".

The second type of farmers is characterized by agricultural income derived mainly from animal income. The production systems of this type of farmer are based on animals breeding with a low crop production intended to feed the livestock. These farmers are called "breeders".

Analysis of the results of the surveys showed that these systems are in difficulty. In fact, economic constraints are hampering the development of agriculture in Bir Mcherga delegation, the most important of which is the irregularity of rainfall and the drought problem which threatens agriculture in the region, especially cereal crops. To which are added the

problems of the abandonment of young people from agricultural activity and the rural exodus.

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